

## HYDRODYNAMIC EFFECT IN HETEROGENEOUS ELECTROCHEMICAL SYSTEMS

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Essence of effect of hydrodynamic restriction of speed of chemical reduction of metals (HDRS-effect that on dependences “deposition speed ( $V_{Me}$ ) – the speed of rotation of a sample ( $\omega$ )” after achievement of a maximum happens the subsequent decrease  $V_{Me}$  (to increase  $\omega$ ) up to zero (the territory 1, fig. 1). Specifics of interphase processes of chemical reduction on various mechanisms and products of reaction has decisive impact on character – therefore only partial demonstration of HDRS-effect can take place (fig. 1, curve 2).

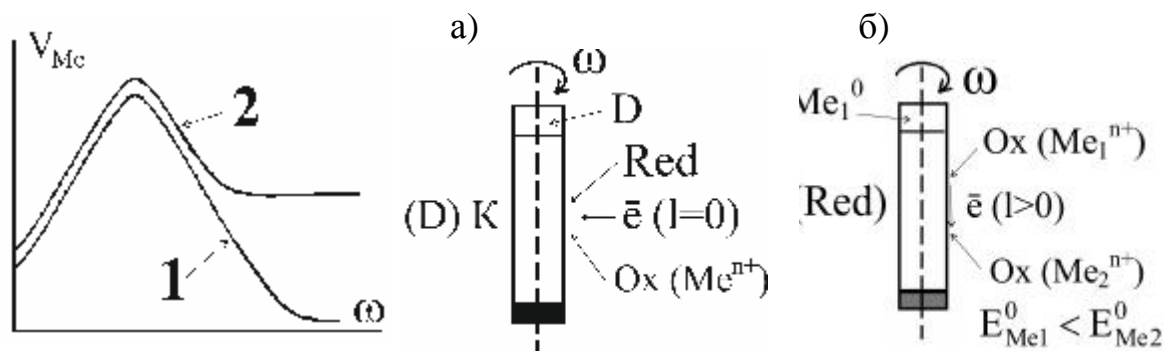


Fig. 1 – type  $V_{Me} - \omega$  with full (1) and partial (2) HDRS-effect demonstration

1. Red -  $n\bar{e} \rightarrow Ox$   
2.  $Me^{n+} + n\bar{e} \rightarrow Me^0$   
Fig. 2 – Diagrams: a) chemical reduction  $Me^{n+}$  on surface catalytic (K); б) chemical dissolution  $Me_1^0$  in bath with  $Me_2^{n+}$   
1.  $Me_1^0 - n\bar{e} \rightarrow Me_1^{n+}$   
2.  $Me_2^{n+} + n\bar{e} \rightarrow Me_2^0$   
 $E_{Me1}^0 < E_{Me2}^0$

The physical and chemical nature of model of processes of chemical reduction (according to diagrams – fig. 2 a, b) in the conditions of HDRS-effect is established on the basis of systematic calculations kinetic ( $V_{Me}$ ,  $\tau_{1/2}$ ), physical ( $F_{bf}$ ,  $F_{cf}$ ,  $q$ ) and hydrodynamic ( $Re$ ,  $Te$ ) factors. Results of calculations showed that the effect of HDRS is connected with demonstration of effect of pushing away of reaktionsnoaktivny particles ( $Ox$  and  $Red$ ) from a sample surface, when performing conditions:  $F_{cf} > F_{bf}$ ,  $\tau < \tau_{1/2}$ .